

Claims

1. An insulating film measuring device for evaluating properties of an insulating film, the insulating film measuring
5 device comprising:

an ion irradiating unit operable to irradiate the insulating film with ions; and

10 a spectrum measurement unit operable to measure a spectrum of secondary electrons emitted from the insulating film during ion irradiation.

2. The insulating film measuring device of Claim 1, wherein the spectrum measurement unit measures, over time, the spectrum of secondary electrons emitted from the insulating
15 film.

3. An insulating film evaluating device comprising:
the insulating film measuring device of Claim 2; and
a variation detection unit operable to detect, based on a
20 secondary electron spectrum measurement result measured over time by the spectrum measurement unit, at least one of an amount of variation of a rise position of a peak due to kinetic emission of secondary electrons and a rate of variation of the rise position.

25 4. An insulating film evaluating device comprising:
the insulating film measuring device of Claim 2; and
a variation detection unit operable to detect, based on a secondary electron spectrum measurement result measured over time

by the spectrum measurement unit, variation in a peak appearing at a lower energy level than the peak due to kinetic emission of secondary electrons.

5 5. An insulating film measuring device for evaluating properties of an insulating film, the insulating film measuring device comprising:

an ion irradiation unit operable to irradiate the insulating film with ions; and

10 a spectrum measurement unit operable to measure a spectrum of secondary electrons emitted from the insulating film after ion irradiation has stopped.

15 6. The insulating film measuring device of Claim 5, wherein the spectrum measuring device measures, over time, the spectrum of secondary electrons emitted from the insulating film.

7. An insulating film evaluating device comprising:

20 the insulating film measuring device of Claim 5; and
an intensity detection unit operable to detect, based on a spectrum measured by the spectrum measurement unit, an intensity of a peak appearing at a lower energy level than a peak due to kinetic emission of secondary electrons.

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8. An insulation film evaluating device comprising:
the insulating film measuring device of Claim 6; and
a variation detection unit operable to detect variation

in a peak appearing at a lower energy level than the peak due to kinetic emission of secondary electrons.

9. An insulating film measuring device for evaluating insulating film properties, the insulating film measuring device comprising:

an ion irradiation unit operable to irradiate the insulating film with ions; and

10 a spectrum measurement unit operable to measure a spectrum of secondary electrons emitted from the insulating film during ion irradiation and after the ion irradiation has stopped.

10. An insulation film evaluating device comprising:

the insulating film measuring device of Claim 9; and

15 a determining unit operable to determine, after ion irradiation has stopped, based on the spectrum measured by the spectrum measurement unit, an energy difference between a first peak due to kinetic emission of secondary electrons measured during ion irradiation and a second peak appearing at a lower energy level 20 than the first peak.

11. An insulating film measuring device for evaluating insulating film properties, the insulating film measuring device comprising:

25 an electron irradiation unit operable to irradiate the insulating film with an electron beam of variable intensity; and a spectrum measurement unit operable to measure a spectrum of secondary electrons emitted from the insulating film during

electron irradiation.

12. An insulating film evaluating device comprising:

the insulating film measuring device of Claim 11; and

5 a variation measurement unit operable to detect, as the electron beam intensity varies, variation in a rise position of a peak that appears in a secondary electron spectrum measured by the spectrum measurement unit.

10 13. An insulating film measuring method used for evaluating properties of an insulating film, the insulating film measuring method comprising:

an ion irradiation step of irradiating the insulating film with ions; and

15 a spectrum measurement step of measuring, at least one of during and after the ion irradiation, a spectrum of secondary electrons emitted from the insulating film.

14. An insulating film evaluating method including a density of states measurement step of measuring, based on the spectrum measured in the insulating film measuring method of Claim 13, the electron density of states in valence bands of the insulating film.

15. An insulating film measuring method for evaluating properties of an insulating film, the insulating film measuring method comprising:

an electron irradiation step of irradiating the insulating film with electrons while varying an electron beam intensity; and

a spectrum measurement step of measuring a spectrum of secondary electrons emitted from the insulating layer during electron beam irradiation.

5 16. An insulating film evaluating method including a density of states measurement step of measuring, based on the spectrum measured in the insulating film measuring method of Claim 15, the electron density of states in valence bands of the insulating film.

10 17. A discharge display component substrate having a display area, the display area including display electrodes for applying a voltage during discharge display and a display-use insulating film covering the display-use electrodes,

 wherein, on the substrate,

15 a test area for measuring the properties of the insulating layer is provided, and

 in the test area, a test-use insulating film identical in type to the display-use insulating film is provided.

20 18. The discharge display component substrate of Claim 17, wherein the test-use insulating film is sufficiently spacious to accommodate irradiation from a whole ion beam from an ion beam irradiation device.

25 19. The discharge display component substrate of Claim 17, wherein the test area is provided outside the display area.

20. The discharge display component substrate of Claim 17,

wherein a test-use electrode for applying a voltage from an external source is sandwiched between the test-use insulating film and the substrate.

5 21. The discharge display component substrate of Claim 20, wherein the display electrodes and the test-use electrode are formed from a same type of material.

10 22. The discharge display component substrate of Claim 20, wherein an electrode pad to which the voltage is applied and the test-use electrode are connected.

15 23. The discharge display component substrate of Claim 17, wherein the display-use insulating film and the test-use insulating film are formed simultaneously.

24. A plasma display panel comprising:
the discharge display component substrate of Claim 17; and
a second substrate disposed an interval away from
20 the discharge display component substrate, so as to be opposite
the display-use insulating film,
wherein a gap between the two substrates is filled with
a discharge gas.

25 25. An insulating film evaluating method for evaluating the discharge display component substrate of Claim 20, the insulating film evaluating method comprising:

an ion irradiation step of irradiating the test-use

insulating film with ions while applying a negative voltage to the test-use electrode;

a spectrum measurement step of measuring, at least one of during and after ion irradiation, a spectrum of secondary electrons
5 emitted from the test-use insulating film; and

an evaluation step of evaluating, from the measured spectrum, properties of the display-use insulating film.